Fleet Energy Training Forum
Commander, Submarine Force Atlantic

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Overall Classification
UNCLASSIFIED

Submarine Energy

- ✓ **Powered by an alternative energy source (nuclear), submarines are participating ships of the 2016 Great Green Fleet deployment**
- ✓ **Submarine fuel use is closely tracked to meet or exceed planned life expectancy**
- ✓ **In port energy use is minimized by powering down systems not needed for habitability and safety**

Current Practices & Efficiencies

- ✓ In port, major systems are de-energized or operated at reduced load
  - Secured: Radar, Sonar, Atmosphere Control, Fire Control, Lube Oil Systems, Laundry
  - Reduced: A/C system reduced to ½ capacity
- ✓ Regular heat exchanger cleaning
- ✓ Hull cleaning at every drydocking
- ✓ Ship transits are planned at most energy efficient speeds
  - VIRGINIA Class and follow-on classes have life-of-ship cores

Annual Environmental & Energy Award

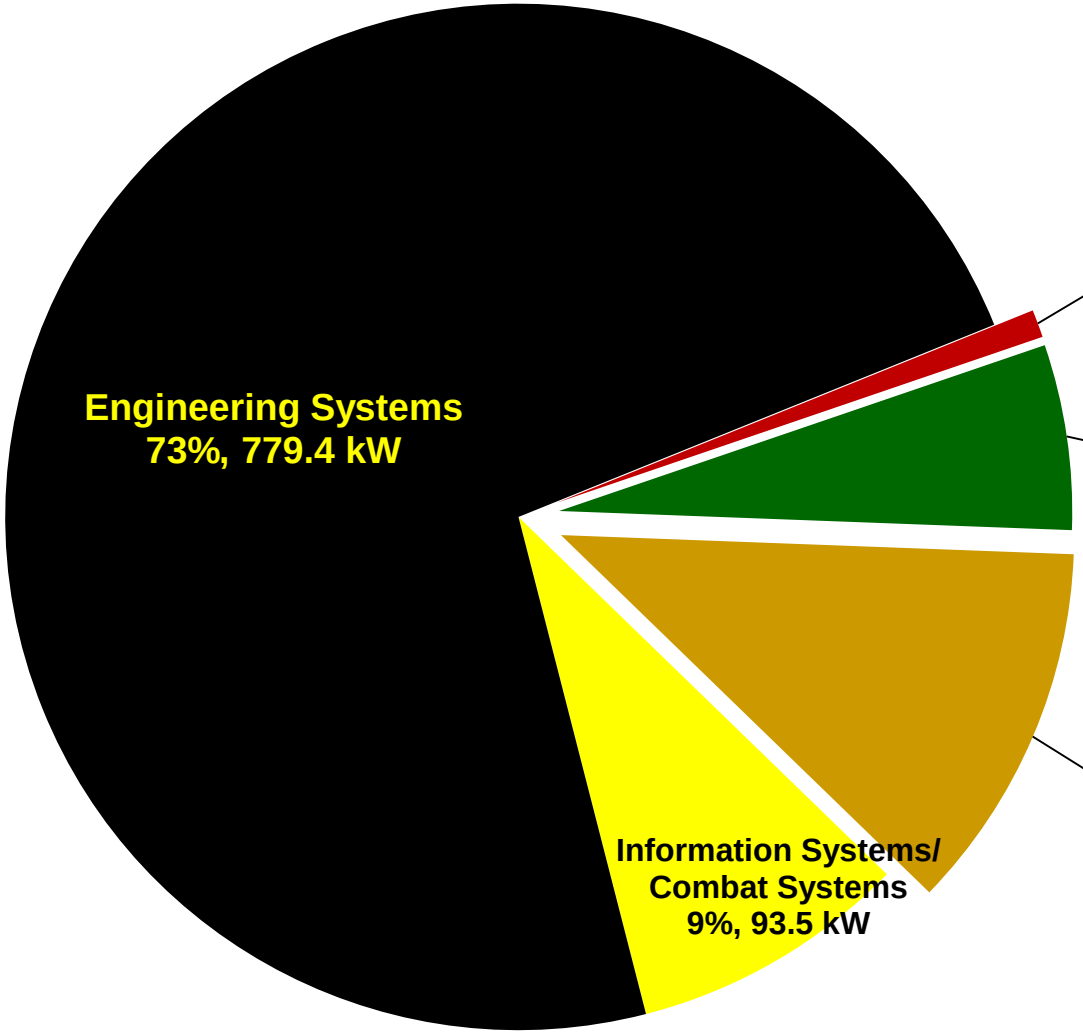
Environmental Protection and Energy Conservation (EPEC) Award

CY 2013 Winners

USS MISSISSIPPI (SSN 782)

USS RHODE ISLAND (SSBN 740)

In-port Submarine Electrical Trade-Space



Discretionary Load
<1%, 1.4 kW

Habitability
(lighting, galley)
6%, 62.3 kW

Environmental
Controls
11%, 124.7 kW

Trade-Space

Typical Discretionary Loads (120V receptacles)

- Crew Televisions/DVD/etc : 480 W
- Personal Electronic Equipment: 480 W
- Misc Electronic Equipment: 480 W

Discretionary Trade-Space = 1.4 kW

Submarine In-port Energy

Energy Utility Reports

- ✓ Meters installed at Norfolk submarine pier
- ✓ Distributed by TYCOM to unit COs via Squadron
- ✓ Provides awareness of energy usage and cost

USS BOISE Monthly Utility Report (Electric)
Billing Period – 8/10/2013 – 9/6/2013

USS BOISE was pier side in Norfolk one time between 8/10/2013 – 9/6/2013. BOISE consumed 378,193 kilowatt hours (kWh) of electricity during these port calls with cumulative cost of $38,784 (based on $0.10255/kWh). BOISE's Average daily consumption was 23,186 kWh ($6 & 57 kWh above monthly class average). The SSN class comparison is depicted below.

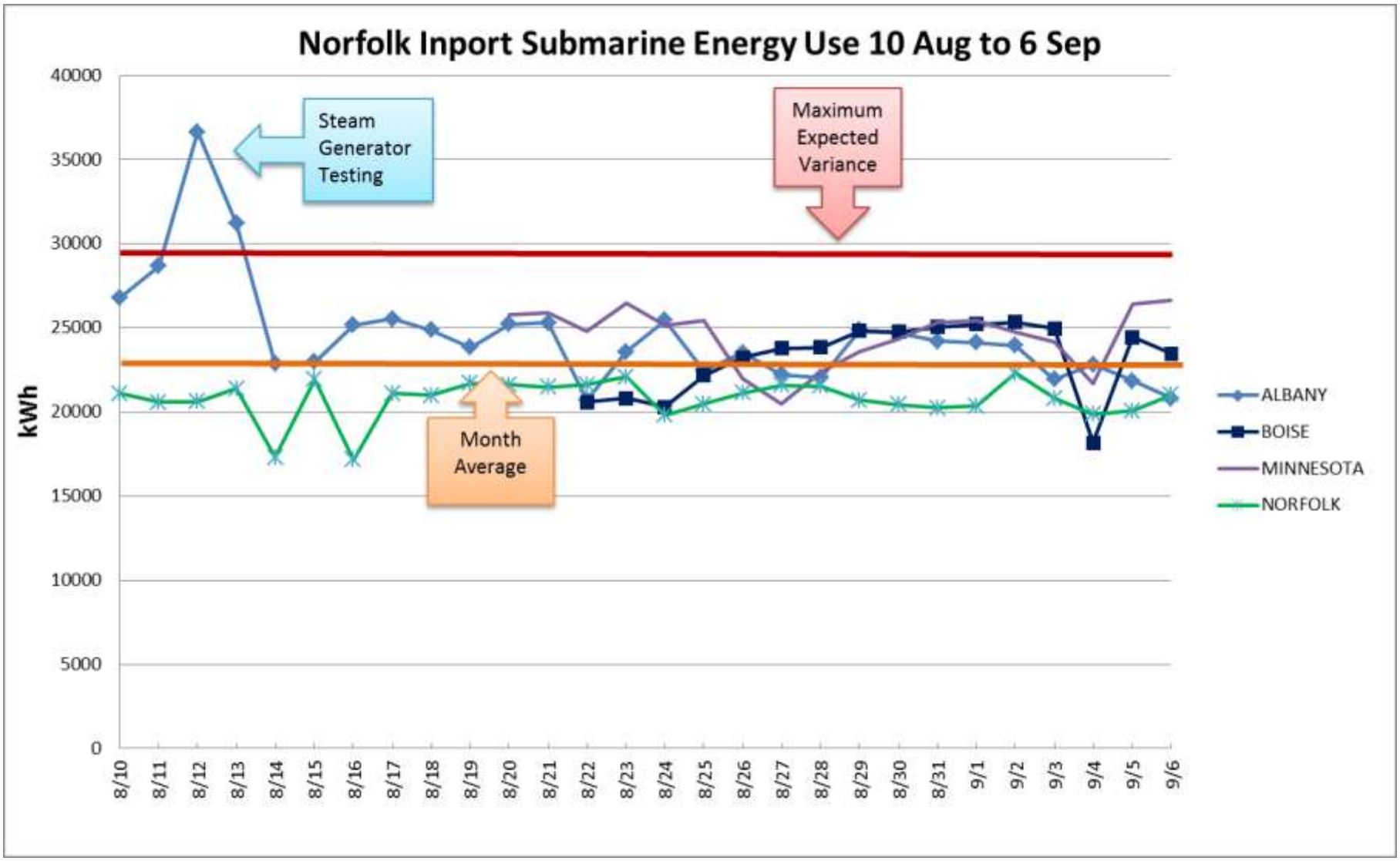
Tables: Utility Report Summary (Electricity)[1]

#	Hull #	Ship Name	Usage in Period kWh[2]	Average Daily Use KWh[3]	Days In Port[3]	Average Daily Cost[3]	Cost in Period[2]
1	SSN 714	NORFOLK	581,181	20,756	28	$2,129	$59,600
2	SSN 764	BOISE	378,193	23,186	16	$2,378	$38,784
3	SSN 783	MINNESOTA	448,068	24,494	18	$2,512	$45,949
4	SSN 753	ALBANY	688,543	24,591	28	$2,522	$70,610
		Total	2,095,985			Total	$214,943
				20,816	90%	$2,135	$50,935
			Class Average	23,129	100%	$2,372	$56,595[4]
			BOISE	23,186	100%	$2,378	$38,784
				25,442	110%	$2,609	$62,254

Monthly Averages for BOISE

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	25,801	17,566	17,886	16,841	21,637	22,592	23,972	23,186				

Submarine In-port Energy



Future Practices & Efficiencies

- ✓ Metering at Kings Bay and Groton submarine bases
- ✓ Biofuel substitute for emergency diesel engines
- ✓ Low impact antifoul coating on SSGN topside surfaces
  - Reduces drag
  - Reduces in-port hull cleaning

Conclusion

Submarine Force…

- ✓ **Operates in an energy efficient posture**
- ✓ **Manages energy consumption**
- ✓ **Looks forward to continued pursuit of energy efficiency**


PAX PER TRIDENTEM
Commander
Submarine Force Atlantic

Backup Slides

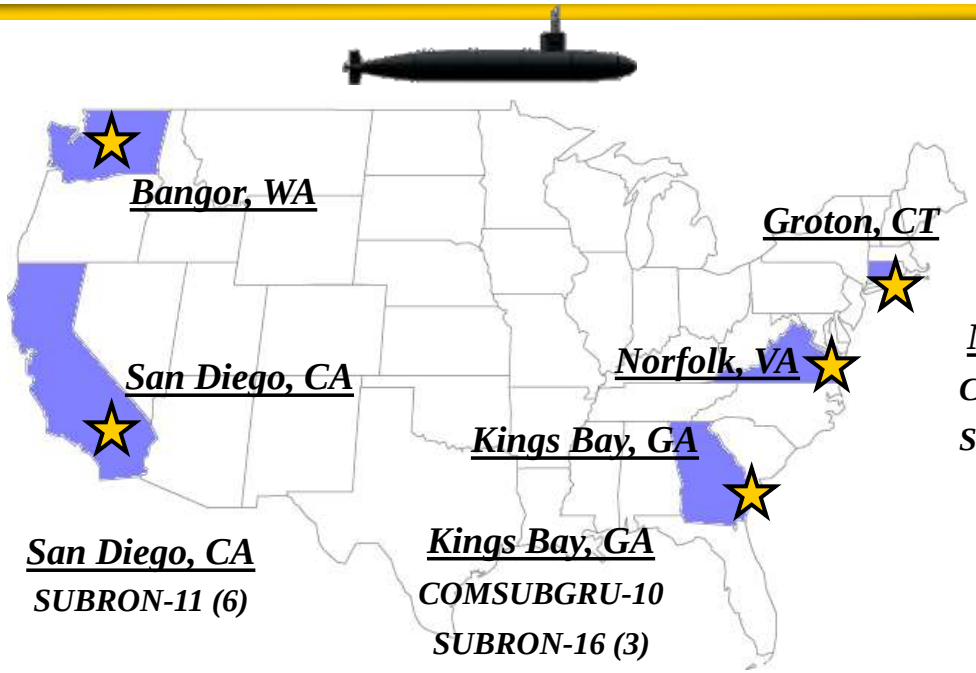
Overview

- **Submarine Force Today**
- **Submarine Operations**
- **Submarine Culture**
- **Submarine Energy**

SUBFOR Today

Bangor, WA
COMSUBGRU 9
SUBDEVRON-5 (3)
SUBRON-17 (7)
SUBRON-19 (3)

Groton, CT
COMSUBGRU-2
SUBDEVRON-12 (8)
SUBRON-4 (9)



Norfolk, VA
COMSUBFOR
SUBRON-6 (7)

Pearl Harbor, HI
COMSUBPAC
SUBRON-1 (9)
SUBRON-7 (10)

San Diego, CA
SUBRON-11 (6)

Kings Bay, GA
COMSUBGRU-10
SUBRON-16 (3)
SUBRON-20 (5)

Guam
SUBRON-15 (3)

FORCE STRUCTURE

55 – SSNs (31/24) PAC/LANT
4 – SSGNs (2/2)
14 – SSBNs (8/6)

SUBFOR Manpower

Total: 22,910
Officer: 2,201 A + 489 R
Enlisted: 16,914 A + 1,075 R
Civilian: 1,720
Contractor: 511

Current Submarine Classes

OHIO Class

Length: 560 feet, Beam: 42 feet

Displacement: Approximately 18,750 tons submerged

Speed: 20+ knots

LOS ANGELES Class

Length: 360 feet, Beam: 33 feet

Displacement: Approximately 6,900 tons submerged

Speed: 20+ knots

SEAWOLF Class

Length: SSNs 21 & 22: 353 feet; SSN 23: 453 feet, Beam: 40 feet

Displacement:
SSNs 21 & 22: approximately 9,100 tons submerged; SSN 23 approximately 12,200 tons submerged

Speed: 25+ knots

VIRGINIA Class

Length**: 377 feet, Beam: 34 feet**

Displacement: Approximately 7,800 tons submerged

Speed: 25+ knots

Submarine Missions

Strike

Strategic Deterrence

ASW

SOF

Submarine Force Missions

ISR

ASUW

Counter Drug Ops

Mine Warfare

Submarine Operations

Submarines are…

- ✓ Nuclear powered
- ✓ Independently operated
- ✓ Completely enclosed
- ✓ Confined working and living environments

Submarine Culture

- **Procedural compliance is the key to Submarine Force's success**

- **A culture of rigorous adherence to procedural compliance allows submarines to operate most efficiently and safely per design**